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(12) **PATENT APPLICATION** **A1**

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(54) Simplified apparatus for simultaneous delivery and cutting of strips of wound materials with automatic changing of the roller in use

(57) The apparatus is noteworthy in that the driving drum 3 incorporating the cutting element is mounted transversely with free rotation between front and rear walls 1a-1b of the casing 1 and the roll of material in use is simply placed on the drum, while also being supported in a rolling manner on a cylinder 16 that can rotate with respect to said walls; with the free strip to be drawn out extending under the apparatus after having been wound onto the drum and having been passed between two idler rolls 14-15 and an opening 1e of the casing; a device 18 that is sensitive to the weight of the almost-empty roll of material, pivots when said roll is able to pass between the drum and the rotary cylinder in order to be received in a magazine 30 and actuates the automatic installation of a new roll retained until that time in the upper part of the apparatus; a profiled element traverses the drum to interact alternately with one or the other of the front or rear walls of the casing so as to stop the drum after cutting and to return the drum to the standby position.

The invention concerns a simplified apparatus for simultaneously delivering and cutting strips of wound materials with automatic changing of the roller in use.

The object of the invention pertains to the technical sector of means of delivery of specific lengths of strips wound on a spool or core. In particular, but not by limitation, the invention applies to apparatuses for simultaneous delivery and cutting of paper, tissue, and other wiping materials.

The apparatus according to the invention is of the well-known type according to which the roll of material in use is preferably installed under pressure directly on a drum with a non-slip surface, such that by simple manual pulling on the strip of material extending from the apparatus, a strip whose length is substantially equal to the diameter of the drum is delivered and cut automatically by a serrated cutting device that is associated with the drum and protrudes out of the drum when it is driven in rotation by pulling on the material, so as to penetrate the material thus stretched on either side of the cutting device. After the cutting, the released drum returns to its starting position by means of additional elements, and a new strip of material extends from the apparatus.

In certain cases of use of this type of apparatus, it is necessary to install apparatuses of low depth, delivering strips of a narrow width from large diameter roles and enabling automatic changing of rolls.

To meet these requirements, a novel apparatus has been created for simultaneous cutting and delivery from the driving drum with a non-slip surface in which the cutting element moves as indicated above.

According to the invention, the driving drum incorporating the cutting element is mounted transversely with free rotation between front and rear walls of the casing, and the roll of material (R1) in use is simply placed on the drum, while also being supported in a rolling manner on a cylinder that can rotate with respect to said walls; with the free strip to be drawn out extending under the apparatus after having been wound onto the drum and having been passed between two idler rolls and an opening of the casing; a device sensitive to the weight of the almost-empty roll of material pivots when said roll is able to pass between the drum and the rotary cylinder in order to be received in a magazine and actuates the automatic installation of a new roll retained until that time in the upper part of the apparatus; a profiled element traverses the drum to interact alternately with one or the other of the front or rear walls of the casing so as to stop the drum after cutting and to return the drum to the standby position.

These characteristics and others as well shall be evident from the description that follows.

To define the object of the invention without, however, limiting it, in the accompanying drawings:

Fig. 1 is a perspective view depicting the apparatus according to the invention with the cover open.

Fig. 2 and 3 are views depicting the front and back of the apparatus, respectively.

Fig. 4 is a sectional drawing along the line 4-4 of Fig. 5.

Fig. 5 is a sectional plan view along the line 5-5 of Fig. 4.

Fig. 6 is a sectional view along the line 6-6 of Fig. 4, depicting the rear face of the drum.

Fig. 7 is a sectional plan view along the line 7-7 of Fig 6, depicting the stop phase of the drum after cutting.

Fig. 8 is a sectional view along the line 8-8 of Fig. 4, depicting the front face of the drum.

Fig. 9 is a sectional plan view along the line 9-9 of Fig. 8.

Fig. 10 is a partial sectional view along the arrow F of Fig. 8.

In order to make the object of the invention more concrete, it is now described in non-limiting exemplary embodiments depicted in the drawings.

The apparatus depicted, in particular, in Fig. 1 comprises a wall casing (1) composed, for example, of a rear wall (1a) complete with wall mounting means, of a front wall (1b) limited at the bottom, of two side walls (1c), and of a bottom; with the entire unit being closed by a cover (2) with a lock.

Underneath the bottom (1d), a drum (3) of diameter (D) implemented in several assembled parts so as to constitute a jacket (3a) and two end plates (3b-3c) is mounted with free rotation between the front and rear walls. An opening (3d) is provided in the jacket to make way for a serrated cutting blade (4) supported with free rotation at (5) on the end plates by an L-shaped blade holder (4a), of which the central part or angle of the L has, on the side facing the rear end plate (3b) a profiled protrusion (4b) passing through said end plate through an opening in the shape of an arc of a circle (3c) to rest against a cam (6) attached on the wall (1a) so as to be radially controllable relative to the axle (3e) of rotation of the drum (Fig. 6).

On the opposite end, the drum has an axle (3f) passing through the front wall (1b) of the casing, and accommodating on its end a control knob (7).

Inside the drum, a small bar (8) of a length slightly longer than that of the drum is arranged parallel to the axle of rotation, such that in one operating position the end (8a) of the small bar rests in an opening (3g) in the end plate (3c) while not passing through to the outside, whereas the other end (8b) passes through an opening (3h) of the end plate (3b) exiting in close proximity to the rear wall (1a) of the casing (Fig. 5).

As explained in the following, in a different operational phase, it is the end (8a) that passes outside the drum, whereas the end (8b) is retracted, to interact alternately with a stop (9) integrated on the rear wall (1a) or with an inclined plane (10) integrated on the front wall (1b).

In said operational phases, the small bar (8) also interacts by means of a protrusion (8c), with a stop (11) located inside the drum, and an appropriately arranged spring (12) returns the small bar to its stop position.

With regard to the drum (3), it is also discernible that it has at its center a peripheral groove (3i) to accommodate a belt (13) that wraps in a groove (14a) at the center of a lower roll (14) supported with free rotation by the front and rear walls of the casing. Another similar roll (15) is mounted in the same manner beside the first leaving sufficient space between them for the passage of the material to be delivered but too small for accidental insertion of the fingers of the user, to prevent any contact with the cutting blade during its rotation. The rolls (14 and 15) are preferably attached slightly protruding into the opening (le) in the bottom of the casing in order to be manually activated if necessary.

The first roll (R1) of material to be cut is simply placed supported on a cradle composed of three elements, i.e.: the drum (3), a rotary cylinder (16) supported with free rotation on the front and rear walls of the casing, and a deflector (17) integrated on one side wall (lc) of the casing.

In front of the cylinder (16) a pallet (18) is arranged, of which the end arms (18a) (18b) are hinged at (19) on the front and rear walls of the casing, near the axle of rotation of the cylinder, whereas the central part (18c) runs in the direction of the drum. On the side toward the rear wall of the casing, the arm (18b) has an oval opening (18d) interacting with a pin (20a) on a vertical rod (20) running toward the top part of the wall (la) of the casing guided with play by the bracket (21) or similar means (Fig. 3). A spring (22) connects the pin (20a) to a low fixed point of the casing to return the rod (20) downward and the pallet (18) to the up position, due to the eccentric position of the pin (20a) relative to the points of rotation (19) of the pallet.

At its top, the rod (20) has a recess (20b) to pass next to a protrusion (1f) of the wall of the housing on which is supported a hook (23) hinged at (2b) on said wall, and whose active end (23a) retains in its normal position a projecting part (24a) formed on an inclined flap (24) that is hinged at its opposite end at (25 and 26) on the walls of the casing (Fig. 1 and 3).

It can be seen that the projecting part (24a) of the flap passes through an opening shaped as an arc of a circle (lg) in the wall of the casing, and that a pin (24b) of the flap located near its upper articulation (26) also passes through an opening shaped as an arc of a circle (lh) in the wall; with this pin being connected with the hook (23) by a spring (27).

As can be seen, the flap (24) is designed to retain, on standby, above the roll (R1) in use, a second roll (R2) that is wedged between this flap and one side wall (lc) of the casing.

Now, the operation of the apparatus is described with reference to the figures.

To place the apparatus in service, the roll (R1) is placed on the drum (3), the cylinder (16), and the deflector (17), and the free strip is brought out below the apparatus by activating the drum using the knob (7) or possibly the roll (14).

Pulling on the strip outside the apparatus causes the rotational driving with slippage of the drum because of the fact that the drum has on its periphery a catching surface of the type of emery-coated cloth (28), for example.

During this rotation of the drum, the cutting blade (4) that is withdrawn inside the drum comes to rest with its section (4b) against the cam (6) whose profile is developed such that after passage under the roll (R1), the blade comes out of the drum and penetrates into the strip of material. In its maximum excursion position (Fig. 2), and because of the fact that the strip is stretched on either side by the effect of manual pulling and the support of the roll on the drum combined with the rotation, the strip is detached and the released drum continues its rotation, while the blade retracts again inside the drum.

When the drum reaches the position where the cutting blade is retracted and located behind the roll of material, the small bar (6) that is retained by the stop (11) and the inclined spring (12) in the position where the profiled end (8b) protrudes from the drum, rests with said end against the stop (9), as depicted in Fig. 5, 6, and 7, thus stopping the drum.

In reaction, because of the return spring (12), the small bar moves (arrow a) into the passage opening (3h) and, under the effect of the spring, withdraws inside the drum, while the other end (8a) of the small bar, in turn, protrudes.

The apparatus is then ready to be used again.

When a new strip is pulled, making the drum turn, the protruding, profiled end (8a) of the small bar rests against the inclined plane (10) on the front wall of the casing (Fig. 8, 9, 10), and said small bar is repelled (arrow b) to be returned to the position where the end (8b) protrudes, to stop the drum after cutting.

When the roll (R1) is almost empty (i.e., when there remain only a few lengths of the strip to be delivered around the spool or core (A), it can rest on the pallet (18), extending between the drum (3) and the cylinder (16). However, the weight of the core is inadequate to make the pallet pivot; that is why the core is weighted either by the introduction of an independent bar (29), or by the use of a core which is itself weighted. It should be noted that this additional weight of the roll prevents any slippage on the drum at the time of manual pulling, when the roll is has been mostly cut and is thus less heavy.

The core thus weighted causes the pivoting of the pallet (18), which, with its arm (18b) then pushes the rod (21) upward opposing its return spring (22).

The top end (20b) of the rod raises the hook (23), thus releasing the flap (24), which, under the effect of the weight of the standby roll (R2), pivots downward traveling in the opening (lg). The roll (R2) then takes the place of the roll (R1), which has fallen into a lower receptacle (30). In parallel, the spring (22) has returned the rod (20) downward and the pallet (18) to the up position, while the spring (27) also returns the flap (24) to a locking position by a hook (23).

When new manual pulling on the exposed strip of the roll (R1) occurs, the roll (R2) will be driven by the drum (3) and two strips will be delivered simultaneously until the roll (R1) is finished.

As a variant, in particular if one wishes to apply the invention to deliver wider strips, it may be of interest to replace the arrangement comprising the small bar (8), the stops (9) and (11), the inclined plane (10), and the spring (12) by the arrangements known from previous applications also held by the patentee, in particular, application 85.02873, i.e., using a fall-checking device, a ratchet, fixed or movable stops, and guide means, associated with the rotation of the drum arranging them to correspond to the structure of the present invention.

The advantages are clear from the description; particular emphasis is placed on simplification of the apparatus relative to existing devices, smooth and precise operation, automatic roll changing increasing the capacity of the apparatus, easy and quick loading of the apparatus due to the absence of any roll support, and the low overall structural depth.

The invention is in no way limited to this embodiment or to the embodiments of its various parts that have been specifically indicated; on the contrary, it includes all variants.

CLAIMS

-1- Simplified apparatus for simultaneous delivery and cutting of strips of wound materials, with automatic changing of the roller in use, of the type in which the roll of material in use is preferably installed under pressure directly on a drum with a non-slip surface such that by simple manual pulling on the strip of material extending from the apparatus, a strip whose length is substantially equal to the diameter of the drum is delivered and cut automatically, by a serrated cutting device that is associated with the drum and protrudes out of the drum when it is driven in rotation by pulling on the material, so as to penetrate the material thus stretched on either side of the cutting device; the apparatus is characterized in that the driving drum (3) incorporating the cutting element (4) is mounted transversely with free rotation between front and rear walls (1a-1b) of the casing (1) and the roll of material (R1) in use is simply placed on the drum, while also being supported in a rolling manner on a cylinder (16) that can rotate with respect to said walls; with the free strip to be drawn out extending under the apparatus after having been wound onto the drum and having been passed between two idler rolls (14-15) and an opening (1e) of the casing; a device (18) sensitive to the weight of the almost-empty roll of material pivots when said roll is able to pass between the drum and the rotary cylinder in order to be received in a magazine (30) and actuates the automatic installation of a new roll (R2) retained until that time in the upper part of the apparatus; a profiled element (8) traverses the drum to interact alternately with one or the other of the front or rear walls of the casing so as to stop the drum after cutting and to return the drum to the standby position.

-2- Apparatus according to claim 1, characterized in that the profiled element (8) is a small bar of a length slightly greater than that of the drum (3) and has a profiled end (8a) to rest on an inclined plane (10) formed on the front wall (lb) of the casing, so as to repel the small bar during the rotation of the drum, before the excursion of the blade for the cutting, in order to place it at the position of protruding at its other end (8b) to rest against a stop (9) formed on the rear wall (la) of the casing, to stop the drum after the cutting, with the small bar being automatically pushed back against a stop (11) inside the drum to arrive at the position of protruding of its end (8b), by an inclined spring (12) inside the drum.

-3- Apparatus according to claim 1, characterized in that the device (18) sensitive to the weight of the almost-empty roll of material and actuating the putting in service of the second roll is a pallet mounted to pivot at (19) on the front and rear walls of the casing, and of which one arm (18b) has an oblong opening (18d) interacting with a pin (20a) made in one piece on a rod (20) guided vertically behind the rear wall (la) of the casing, and whose upper end, when the pallet (18) is pivoted downward, raises a retaining hook (23) of the support device of the standby roll (R2).

-4- Apparatus according to claim 1 and 3 together, characterized in that the support device of the roll (R2) is a flap (24) articulated at its top on the walls of the casing, and extending at an incline downward to wedge the roll between itself and a side wall (lc) of the casing; at its bottom, the flap has on its side facing the rear wall (la) of the casing, a

protrusion (24a) passing through an opening shaped as an arc of a circle (lg) in the wall, and interacting with the active part (23a) of the hook, with a spring (2, 7) attached to the flap and to the hook returning the flap into a locking position after the falling of the roll (R2).

-5- Apparatus according to claim 1, characterized in that the spools or cores (A) of the rolls of material are weighted directly during manufacture or by an added element, to ensure non-slip feeding of the material on the drum under all conditions and to enable the pivoting of the pallet (18) when they come to rest on it.